MEMORANDUM

TO: William W. Burns, City Manager PW12-046

FROM: James P. Kosluchar, Public Works Director

DATE: June 14, 2012

SUBJECT: Updated Water Distribution System TCE Data Summary

This memorandum is intended to supplement information provided to you in a previous memo dated April 27, 2012. Since this memo was issued, staff has digitized all data found in Water Division files. I have attached the previous memo, but have excluded the charts provided at that time to avoid confusion with the most current data.

This updated summary of TCE (trichloroethylene) data is summarized in graphical form and provided for your information. Data provided electronically from the Minnesota Department of Health (MDH) and Minnesota Pollution Control Agency (MPCA) has been augmented with City testing for TCE, begun in 1983 for the Commons Park wells. In addition, a few data points were corrected in the summaries previously provided from the MDH and MPCA.

While the City of Fridley records are fairly complete, it is noted that there are some early testing that was performed by the MDH and MPCA that were not found in our records. We have included summary data from tables found in our records where no laboratory reports were found. This includes most of the pre-1987 data. Several sets of test data do not include chain of custody records or results of blank tests. Blank samples are used to determine whether a test sample has been contaminated with a constituent in the lab or field. Where blank sample records do exist, there were no observations of contamination of test samples for TCE.

Data from 219 sampling dates, nearly all with multiple sample points from either or both source water and finished (treated) water are included in the data compilation. There are 792 samples including laboratory analysis of scores volatile organic contaminants on each sample. Testing is of varying frequency based upon presence of contaminants and whether the test is for source water or finished water and whether the facility is in service.

The first three updated charts include testing conducted by MDH and the City of Fridley at points of entry into the distribution system. In addition, available sample results from within the distribution system are included, however, these are not compliance samples, and are provided for information only. These charts also show the regulated limit and guidance limits established by the EPA and MDH. Chart 1 shows the overall dataset, along with limits, which provides a look at where TCE distribution concentrations tested. Chart 2 shows this information at a better scale to view this data. Chart 3 shows this data after establishment of the EPA MCL (Maximum Contaminant Level) of 5 parts per billion.

The following should be noted in regard to these charts. Of the five sources for distribution water in the City of Fridley, the three points of distribution that had detectable levels of TCE are indicated. These include Commons Park Plant, which has had 65 tests that detected TCE, and a highest level of 9.5, Well 13 which has had four tests that detected TCE, and a highest level of 1.6, and Water Treatment Plant 3, which has had one test showing TCE at 0.7 ppb. Well 1 and Locke Park never had a detectable concentration at their distribution point in 57 total tests. There was a single test for one of the Locke Park Wells that showed a 2.4 ppb concentration.

While the Commons Park Plant had samples that measured over the 5 ppb MCL, a rolling average of four quarterly tests was used by MDH to determine compliance with the standard for TCE. The average of these tests at the distribution point never exceeded the standard, and the City was never issued a notice of violation by MDH. The first test that exceeded the 5 ppb level was taken 11/8/89, and the last test that exceeded the 5 ppb level was taken 7/8/92.

The final four updated charts show the source well TCE concentrations for the Commons Park Wellfield Prairie du Chien-Jordan aquifer wells (6 through 9). Included in the charts are annual water withdrawals from each of the respective wells. These graphs illustrate the reduction in reliance on the Prairie du Chien-Jordan aquifer wells for supply since contamination was discovered. For instance, these illustrate that Well 9 was taken out of service from late 1989 into 2004. Note that in this instance, there is a withdrawal volume shown for 1989, but this is for volume withdrawn at the beginning of the year. The last test showing detection of TCE in one of these wells was in 2008.

There are more test records for all other wells not included in this summary, but none of these detected TCE, other than as noted above.

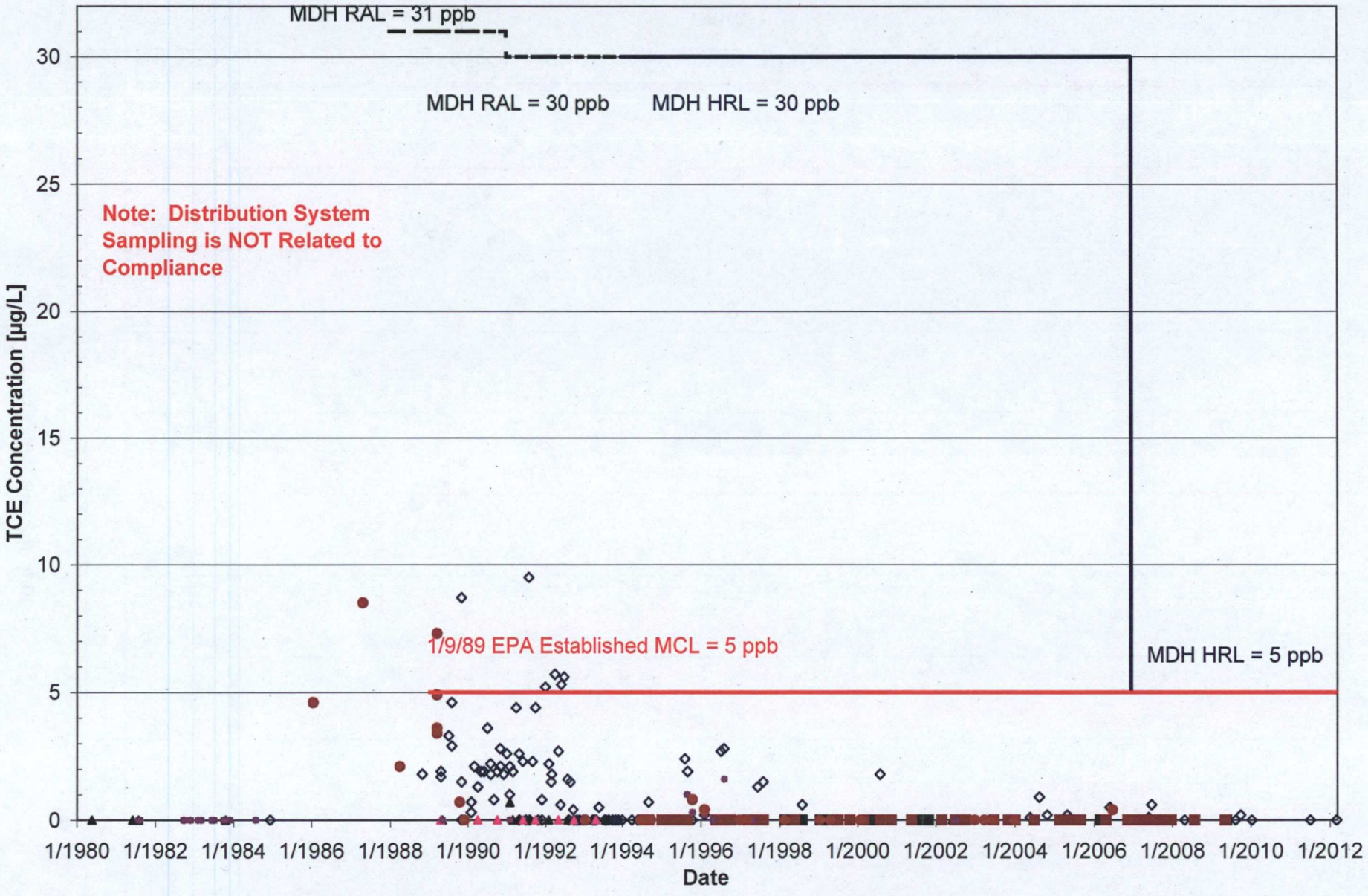
Please let me know if you would like to discuss this matter further, or if I can clarify any of the attached information.

JPK;jpk

Attachments

1. City of Fridley - Finished Water Historic TCE Concentrations

TCE Data Provided by the MDH and City of Fridley



2. City of Fridley - Finished Water Historic TCE Concentrations

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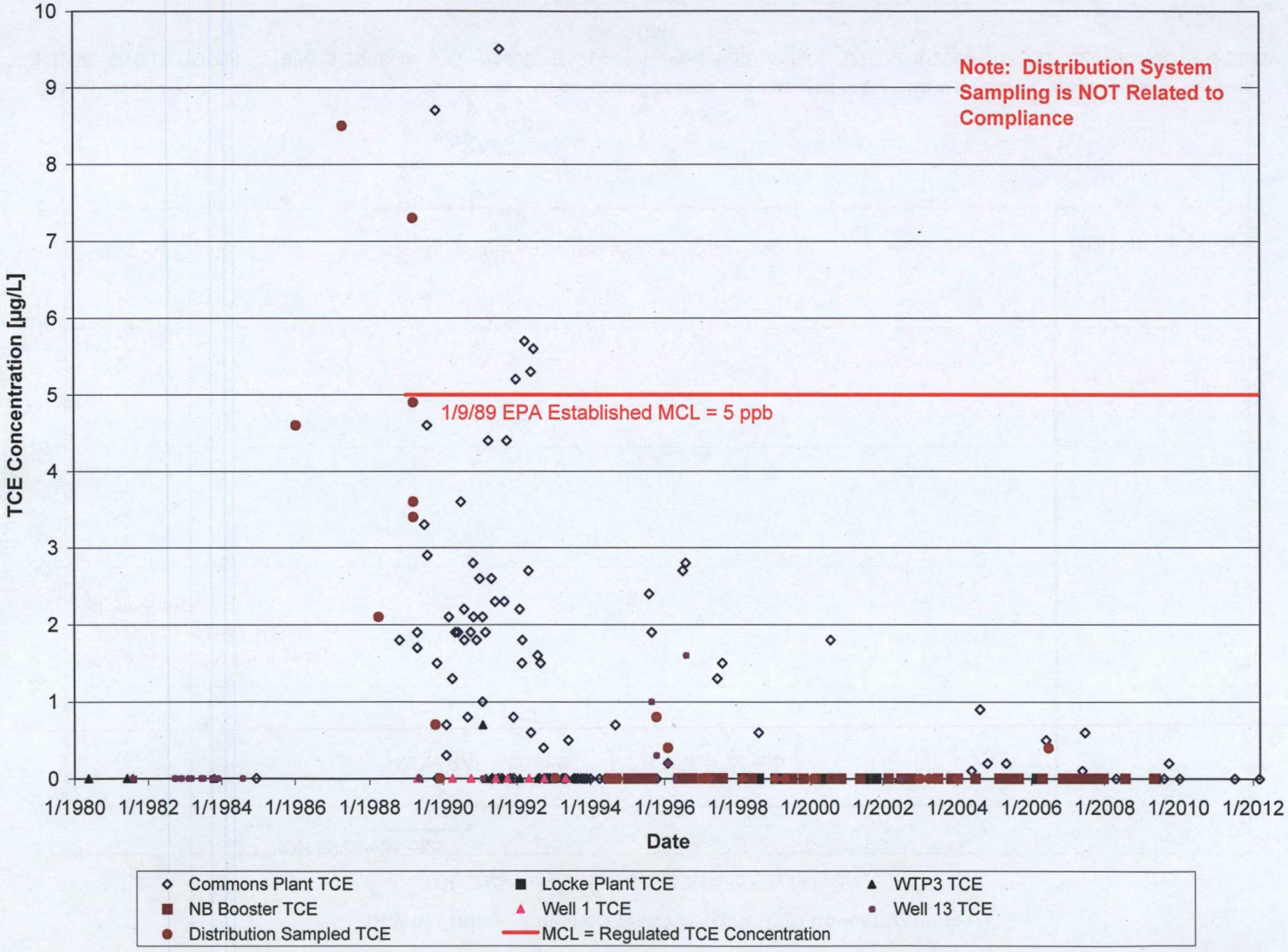

3. City of Fridley - Finished Water Historic TCE Concentrations

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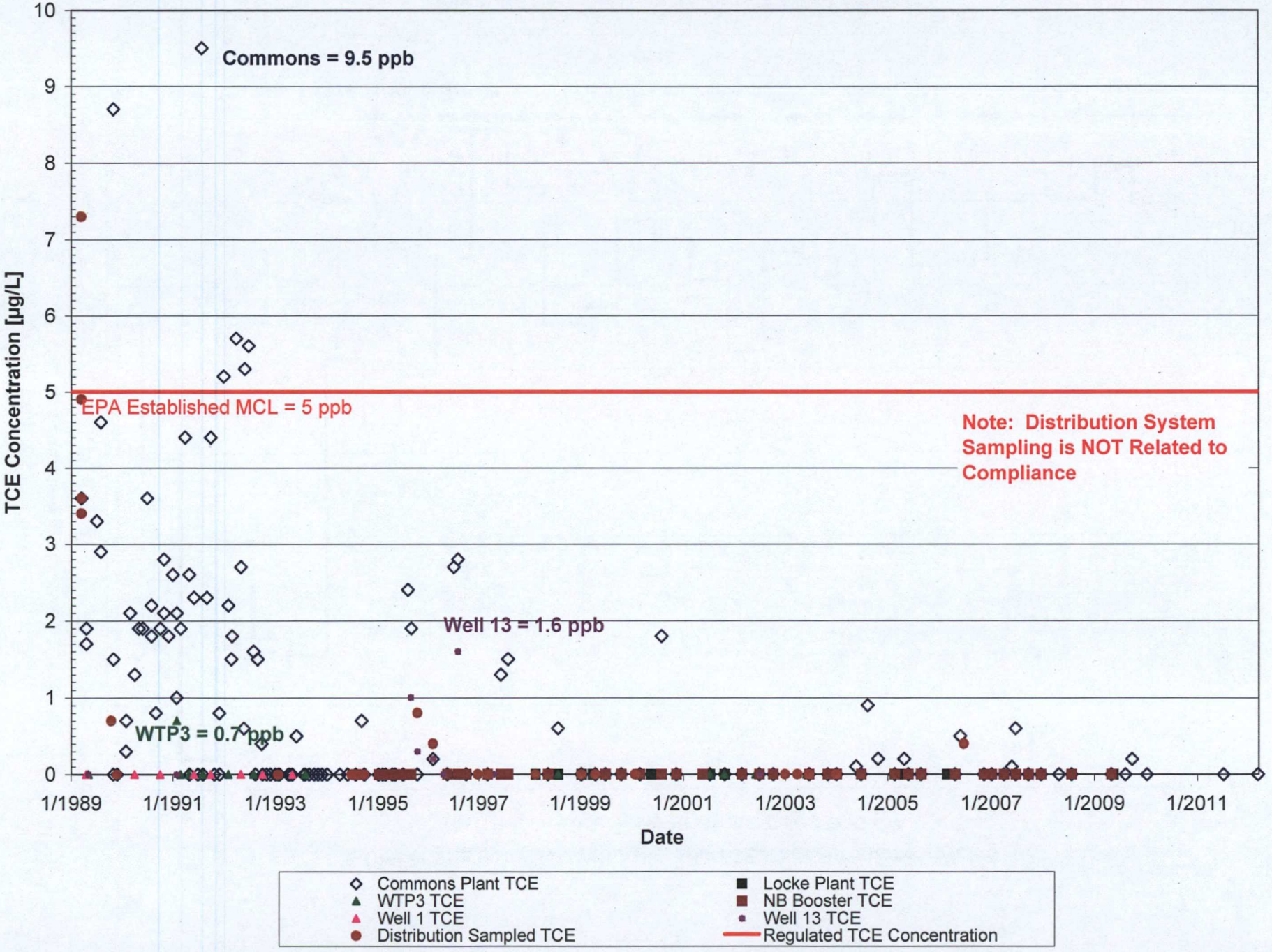
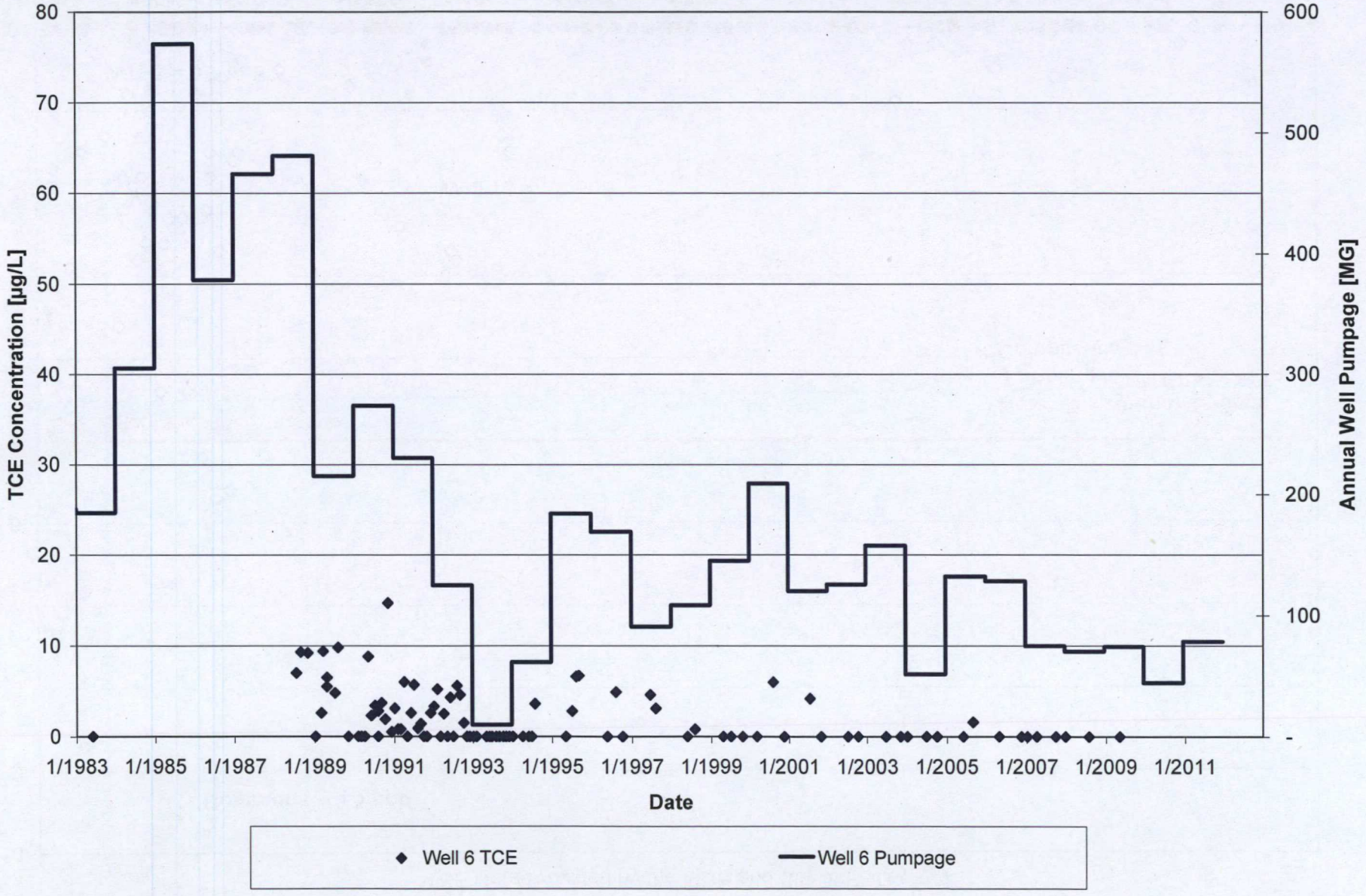


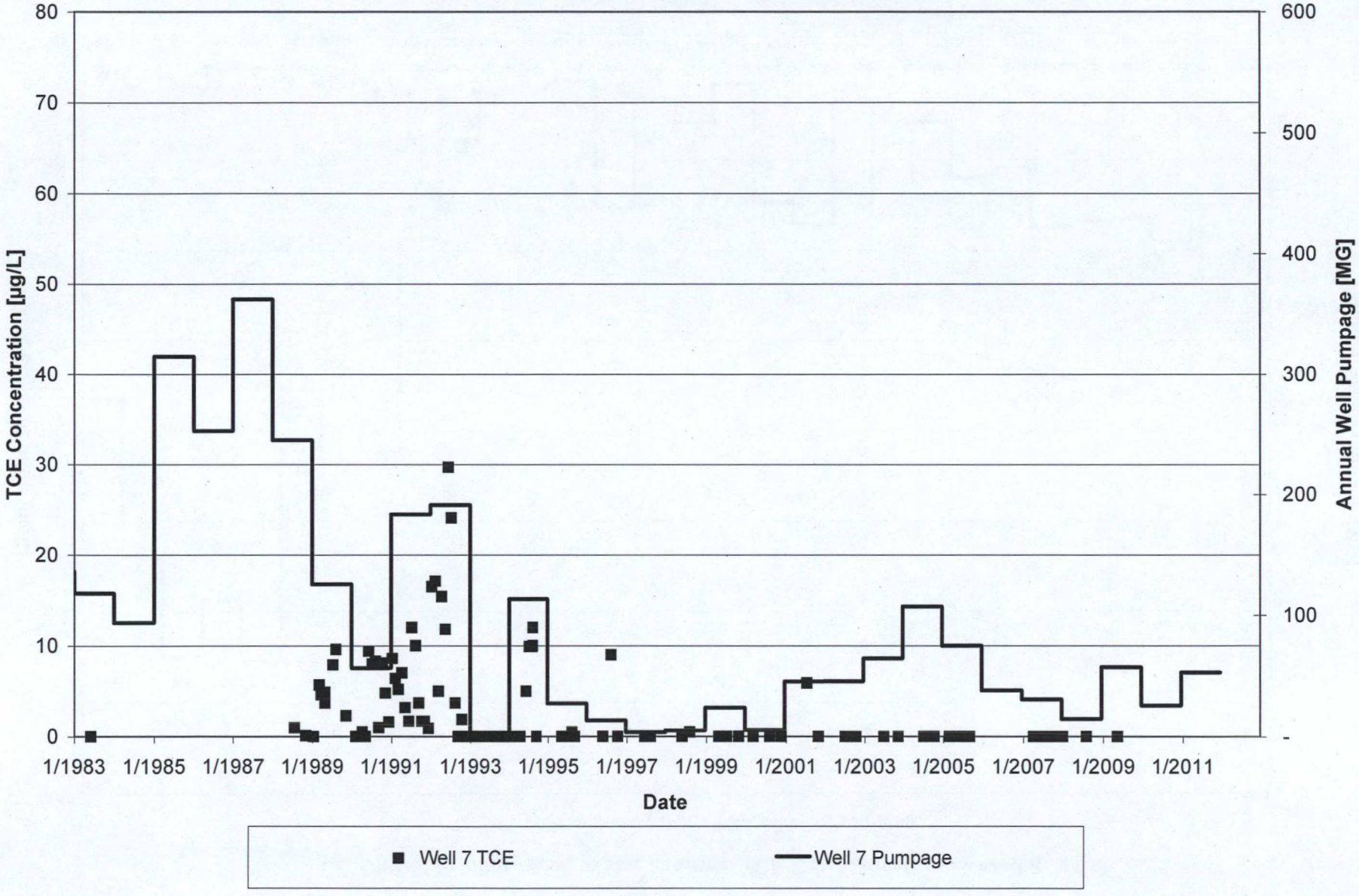
4. City of Fridley - Raw Water Historic TCE Concentrations - Well 6

TCE Data Provided by the MPCA and City of Fridley



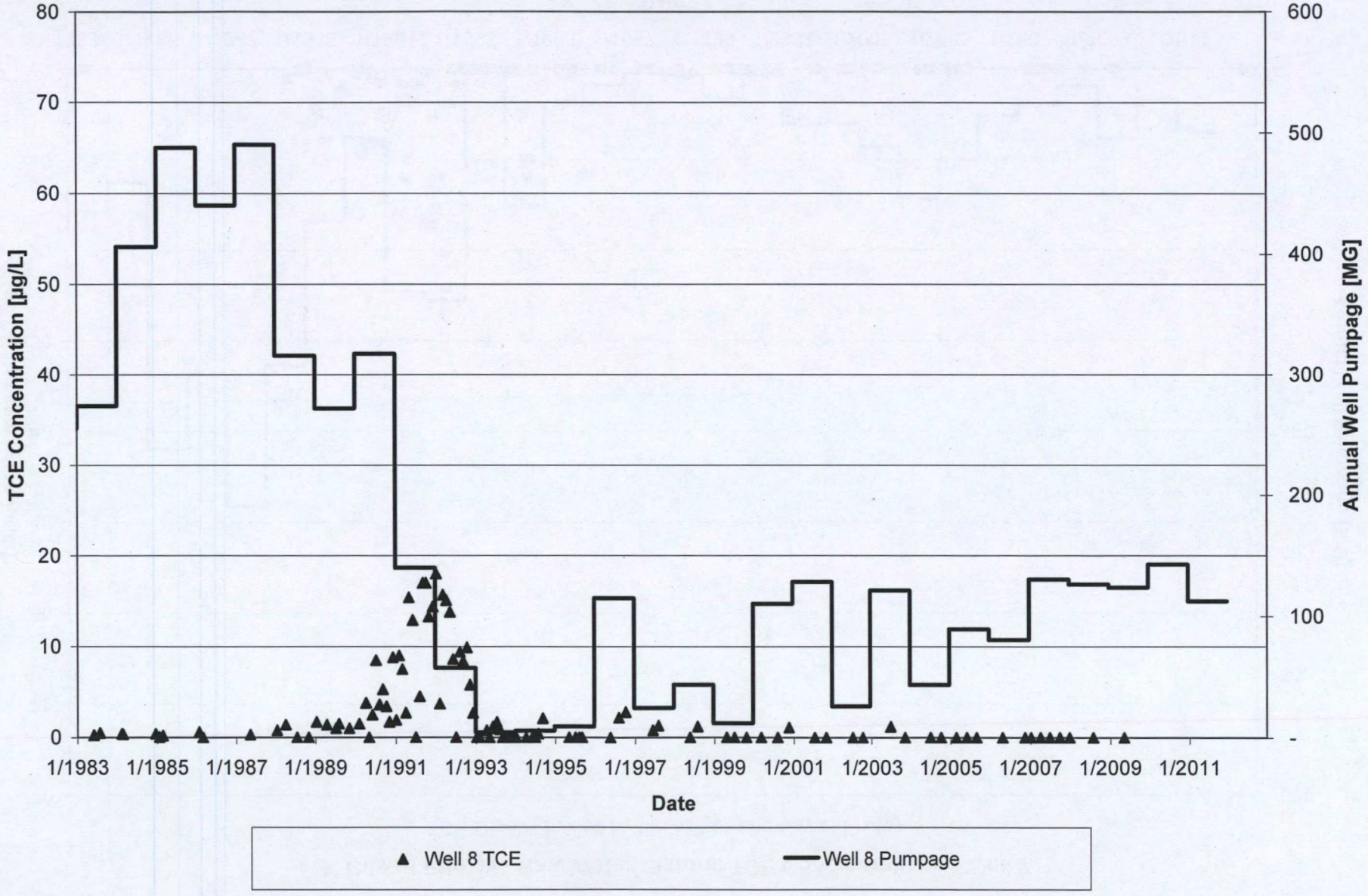
5. City of Fridley - Raw Water Historic TCE Concentrations - Well 7

TCE Data Provided by the MPCA and City of Fridley



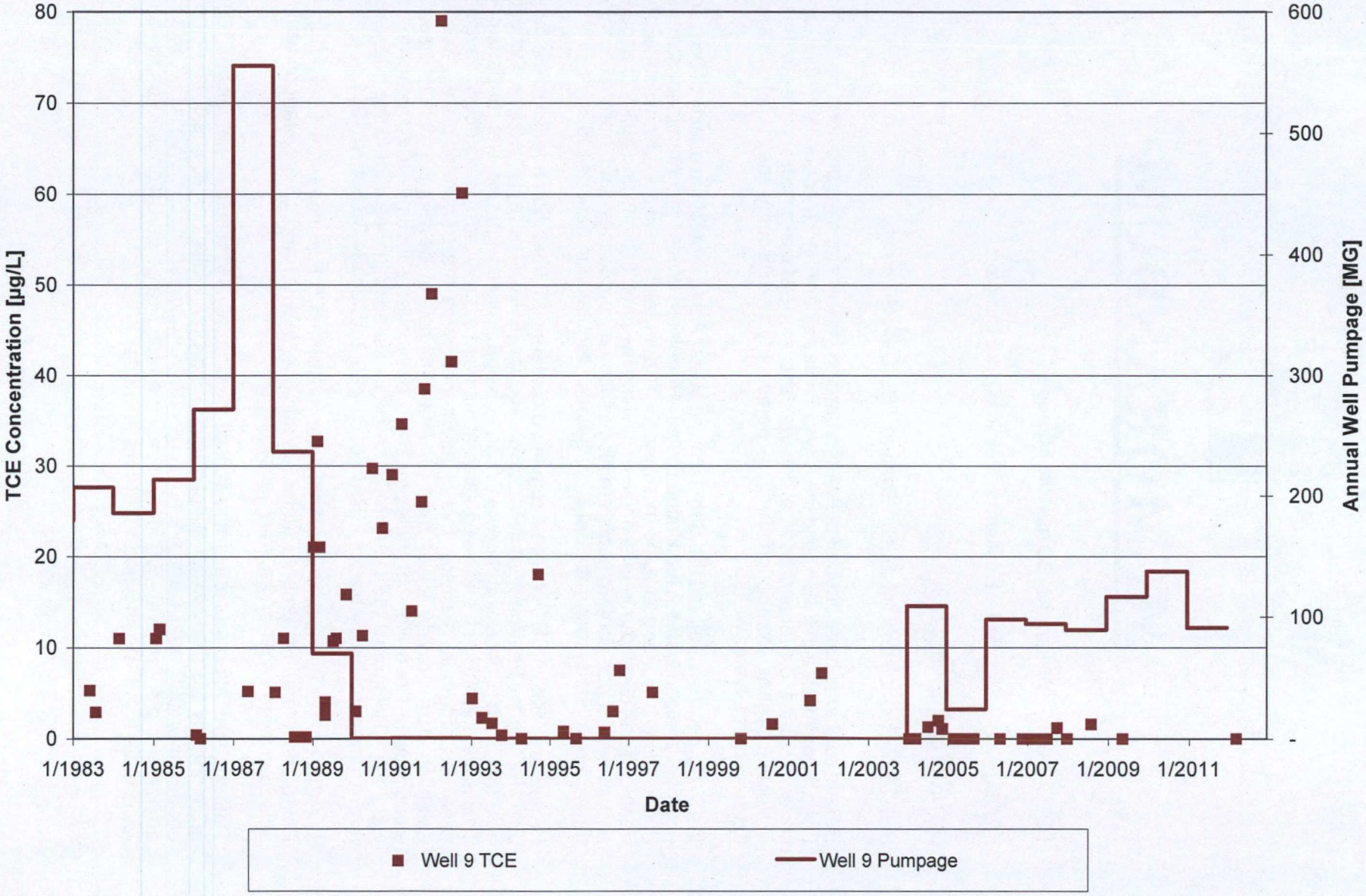
6. City of Fridley - Raw Water Historic TCE Concentrations - Well 8

TCE Data Provided by the MPCA and City of Fridley



7. City of Fridley - Raw Water Historic TCE Concentrations - Well 9

TCE Data Provided by the MPCA and City of Fridley



MEMORANDUM

TO: William W. Burns, City Manager PW12-037

FROM: James P. Kosluchar, Public Works Director

DATE: April 27, 2012

SUBJECT: Water Distribution System TCE Data Summary

Recent concerns have been expressed regarding cancer statistics provided by the Minnesota Department of Health (MDH) and the City of Fridley's drinking water quality. While much of the concern relates to events of several decades ago, some of the concern relates to the presence of Volatile Organic Compounds (VOCs), particularly Trichloroethylene (TCE) contamination in certain source water wells.

In 1974 Congress enacted the Safe Drinking Water Act to protect the quality of both actual and potential drinking water in the United States. Regulated levels for contaminant are established and adjusted by Federal rules in subsequent rulemaking phases. Knowledge of adverse health effects of contaminants, and establishing their health limits and ability to accurately test and analyze those contaminants are all evolutionary processes, and therefore contaminants that are regulated today may not have been so regulated in past decades.

In January 1989, TCE became a regulated contaminant based on a federal rule published in July 1987 by the Environmental Protection Agency (EPA). The regulated limit was established as a Maximum Contaminant Level (MCL) at 5 µg/L (micrograms per liter, or parts per billion). This is the current limit, and is regulated at the point of entry into the distribution system. In the case of Commons Wellfield, this is as water leaves the treatment plant. The limit was established to provide lower than a 1/100,000 risk of developing cancer based on the assumption of two liters of water ingested daily over a lifetime of 70 years for a person weighing 70 kilograms (154 lbs). MDH had established guidance prior to this rule, establishing a recommended allowable limit (RAL) of 31 ppb, reduced to 30 ppb in 1991.

The City of Fridley has three treatment plants, Commons Filtration Plant, Locke Park Filtration Plant, and Water Treatment Plant 3. In addition, Wells 1 and 13 are standby wells and are able to provide water on an emergency basis.

TCE contamination was present in wells at the Commons Wellfield as far back as 1984. There are eight City of Fridley water supply wells at the site. Wells 2, 3, 4, and 5 are in the deepest aquifer (800'-900' deep), and are not subject to VOC contamination. Wells 6, 7, 8, and 9 are in a shallower aquifer (200'-300' deep) known as the Prairie du Chien-Jordan aquifer. These wells have had tests showing VOC contaminants.

The Fridley Commons Well Field was listed as a National Priority List (NPL) "superfund" site on January 19, 1999. This was based largely on risk to exposure of the public to TCE and other VOC contaminants. The site is not a source of these contaminants. The Minnesota Pollution Control Agency (MPCA) conducted a responsible party search to determine the source of contamination and submitted their findings to the EPA. No source was identified. The MPCA subsequently worked to obtain federal funds to conduct a site investigation and cleanup, but funding was not obtained, mainly as the allocations for these cleanups were reduced, and the contamination testing showed reduced concentrations of VOCs, including TCE, during the 2000s.

The other location where contamination has been present, Well 13 located near East River Road and 51st Way, has been monitored for VOCs as well. Production from Well 13 has been restricted due to the proximity to sites with sources of TCE contamination.

This summary of TCE data is provided as we discussed for your information. Data was provided electronically from the MDH and MPCA. While City data is currently not in digital form, the test records from MDH and MPCA the most current testing data was verified to be incorporated into this summary (data collected since 2006). Data from 215 sampling dates, nearly all with multiple sample points from either or both source water and finished (treated) water were compiled. Testing is of varying frequency based upon presence of contaminants and whether the test is for source water or finished water and whether the facility is in service.

The first two charts include testing conducted by MDH and the City of Fridley at points of entry into the distribution system. In addition, available sample results from within the distribution system are included, however, these are not compliance samples, and are provided for information only. These charts also show the regulated limit and guidance limits established by the EPA and MDH.

The final four charts show the source well TCE concentrations for the Commons Park Wellfield Prairie du Chien-Jordan aquifer wells (6 through 9). Included in the charts are annual water withdrawals from each of the respective wells. These graphs illustrate the reduction in reliance on the Prairie du Chien-Jordan aquifer wells for supply since contamination was discovered. For instance, these illustrate that Well 9 was taken out of service from late 1989 into 2004.

Please let me know if you would like to discuss this matter further, or if I can clarify any of the above information.

JPK;jpk

Minnesota Pollution Control Agency

Fridley Commons Park Well Field Superfund Site

Superfund Program Anoka County fact sheet #01b • April 2012

This Minnesota Pollution Control Agency (MPCA) fact sheet for the Fridley Commons Park Well Field Superfund Site, located in the City of Fridley, Anoka County, Minnesota will:

- summarize site historical and investigation activities conducted during the remedial investigation,
- discuss the risks to human health and the environment that may be present at the site, and
- indicate the current status of the site.

Where is the site?

The Fridley Commons Park Well Field is an active well field with eight public wells, owned by the City of Fridley. The well field serves a population of about 29,000. The site is about one mile north-northwest of the intersection of Interstate Highway 694 and Minnesota Highway 65. The site is about one mile east of the Mississippi River and approximately 0.2 mile northwest of Moore Lake. The site provides recreational activities, and land use in the area surrounding it is mostly residential, with some areas of commercial and industrial use.

The city owns and operates eight municipal water supply wells and a water treatment plant (City Plant #2) at the site. Four of the wells (wells #6, #7, #8 and #9) are open to the Prairie du Chien-Jordan (PdCJ) Aquifer. The other four wells (#2, #3, #4 and #5) are screened in the deeper Mount Simon Aquifer. Water from the wells is blended and treated before it is distributed to the community.

What is the site's background?

In 1981, the City of Fridley began sampling its wells for the presence of volatile organic compounds (VOCs). Although trichloroethylene (TCE) was detected in well #9 in February 1984, it was not detected in blended water from the well field. In 1989, TCE was added to the list of chemicals with maximum contaminant levels (MCLs), which specifies maximum concentrations of contaminants allowed by the U.S. Environmental Protection Agency (EPA) for public water supplies under the federal Safe Drinking Water Act. The MCL for TCE is 5 micrograms per liter (µg/L, equivalent to parts per billion).

Subsequent testing of the wells at the site revealed that the four PdCJ Aquifer wells (#6, #7, #8 and #9) were contaminated with low levels of VOCs (mainly TCE). Analyses indicated that well #9 consistently had the highest concentrations of

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TCE. Well #9 was taken out of service in February 1989. Between 1989 and 1993, this well often showed TCE levels above the MCL.

In addition to taking well #9 out of service, the city used blending and decreased reliance on the PdCJ Aquifer wells to meet water-quality standards at the well field. However, the city indicated that periods of peak demand in the summer forced it to utilize the contaminated wells (#6, #7 and #8). This renewed pumping caused the TCE levels in the PdCJ wells to rise again. Thus, the data showed that TCE concentrations in the contaminated wells seem to be directly related to the volume of water pumped from them.

The city's water supply has been partially supplemented by an interconnection to the New Brighton water system that was completed in October 1992. This interconnection provides excess water from a groundwater-treatment system installed in New Brighton to remediate groundwater affected by the release of TCE from the Twin City Army Ammunition Plant (TCAAP). Most water is supplied in winter, as New Brighton's summer demand leaves little water to be provided to Fridley. The city has not used its municipal wells as much since the interconnection occurred.

What's the cleanup history of the Superfund sites in Fridley?

At the recommendation of the Minnesota Department of Health (MDH), the City of Fridley took well #9 out of service due to TCE contamination levels that might cause the water supply to exceed the MCL. Wells #6, #7 and #8, while at various times indicating contamination from TCE, remained in service and have been used primarily during times of peak summer water usage.

On February 20, 1991, the Fridley Commons Park Well Field Site, numbered MN985701309, was placed on the Comprehensive Environmental Response Compensation and Liability Information System (CERCLIS) inventory of potential hazardous waste sites. The preliminary assessment (PA) was completed by MPCA staff and approved by the EPA on September 20, 1991. A screening site inspection (SSI) was conducted by MPCA staff on November 5 and 6, 1991. The SSI report was submitted to the EPA and approved on July 6, 1992. The SSI recommended the site for an expanded site inspection (ESI). The site was added to Minnesota's Principle List of Priorities, or state Superfund list, in June 1992. The 1996 ESI recommended listing on the National Priorities List (NPL) and more effort to define the source within the limitations of cost. The site was listed on the NPL in February 1999.

The MPCA has conducted investigations since the closure of well #9 to narrow the range of the contamination source possibilities. The report by Barr Engineering, titled *Evaluation of Groundwater Contamination, Fridley Commons Park Well Field Site, March 1997*, recommended an alternative water supply to be planned for implementation during peak-demand periods, some longer-term investigative techniques, and additional work to locate the source of the TCE contamination. The report concluded that it is likely an MCL violation will occur. Therefore, the report recommended that a more reliable source of TCE-free water should be provided.

In 2000, the MPCA contracted with Delta Environmental Consultants to conduct a limited remedial investigation of the site. Monitoring Well 2 was sampled along with existing monitoring wells in the area and the Moore Lake Dump was investigated. To do this, a monitoring well was placed near the dump. Because new homes now cover the dump, borings and trenching was out of the question. All well-monitoring data from the dump area showed nonexistent levels of TCE. At that time, evaluation of more recent data for well #6, #7, #8 and #9 showed reduced levels of contamination in all four wells, with only well #9 consistently over the MCL.

In 2002, the MPCA had Delta Environmental Consultants prepare a focused feasibility study (FFS). The FFS evaluated several remedial alternatives, including installing new wells, activated carbon treatment and aeration treatment, to address the remaining contamination above the MCLs.

The city and the MDH continue to monitor the PdCJ wells while they are being used. Monitoring results since 2002 indicated that the concentration levels of TCE have remained below the MCL or were not detected in wells #6, #7 and #8. Concentrations in well #9 have been below the MCLs since January 2004. Also, breakdown products of TCE [for example, dichloroethylene (DCE) or vinyl chloride] were not being detected.

According to the city, wells #6, #7, #8 and #9 were used throughout the summer of 2004 and contaminant levels remained below the MCL. Whereas, studies in the 1990s had shown levels of contamination increasing with usage, water-quality monitoring in 2005 continued to show that levels of TCE were nonexistent or below the MCL. No source of TCE has ever been identified. However, TCE contamination in the groundwater has been documented at other Superfund sites within two miles of the well field. These sites include the Naval Industrial Reserve Ordnance Plant, Kurt Manufacturing, FMC Corporation, and the New Brighton/Arden Hills Twin Cities Army Ammunition Plant.

Given the complexity of the groundwater flow system in the PdCJ Aquifer, other major sources that have been documented nearby, the significant costs of installing multiple monitoring wells necessary for additional investigation activities, the limitation of potential funding and, that TCE has remained below the MCL at the well field since 2004, additional efforts to identify the potential source of TCE contamination at the site were not pursued.

Because the levels of TCE contamination in wells #6, #7, #8 and #9 were nonexistent or not detected in 2005, the MPCA and the EPA wrote a No Action Record of Decision (ROD) that was proposed in July 2005. A public meeting to discuss the proposed ROD was held July 21, 2005. The ROD was signed in September 2005.

Additional monitoring of wells #6, #7, #8 and #9, as required by the ROD, has continued to find TCE concentrations not detectable or below the MCL for all four wells. The MPCA removed the Fridley Commons Park Well Field site from the state Superfund list in April 2010.

Summary of site risks

The chemical of concern for this site is TCE, which is present in groundwater, and had at one time been detected in individual wells at concentrations above the MCL. TCE is a colorless solvent with a slightly sweet odor used primarily in industrial processes as a degreaser for metal parts. Since TCE is very volatile, it is not typically found in surface soil or surface water. TCE is a probable human carcinogen. Long-term exposure to high levels of TCE in drinking water can damage the liver, kidney, immune system, and nervous system.

Potential routes of exposure for TCE-impacted water at Fridley include direct contact during activities such as bathing and dishwashing, ingestion of drinking water, and although the risk is minimal, inhalation of volatilized TCE. However, the well with the highest contamination (well #9) was shut off in 1989, and water from wells #6, #7 and #8 was only used in the summer during periods of peak demand. In addition, water from wells #6, #7 and #8 was mixed with water from non-impacted wells to ensure that any TCE concentrations in the finished water were below the MCL. Thus, human exposure to TCE from the Fridley water system has been below health-based standards or nonexistent.

The vapor intrusion exposure pathway was evaluated consistent with EPA's Draft Subsurface Vapor Intrusion Guidance (November 2002). Potential exposure to contaminants via this pathway is considered negligible because (1) contaminant concentrations in the groundwater aquifer are located at depths greater than 125 feet below ground surface, (2) contaminant concentrations are sufficiently low, and (3) the contaminant concentrations are not found in the uppermost zone of groundwater.

Since contamination at the site is limited to one contaminant in the groundwater, exposure to contamination is limited to uses of the water supply and is regulated under the Safe Drinking Water Act. Contaminant concentrations in individual wells at the site have been below the established MCL, which is a health-based standard, since January 2004. Therefore, current concentrations of TCE at the site are considered protective of

human health. There are no ecological exposures to contamination at this site and therefore ecological risks are not evaluated.

Where can I get more information?

For more information about the Fridley Commons Park Well Field Superfund site or its remediation process, contact:

Nile Fellows, Project Manager
Minnesota Pollution Control Agency
520 Lafayette Rd. N.
Saint Paul, MN 55155-4194
Phone: 651-757-2352
Toll-free/TDD: 800-657-3864
Email: nile.fellows@pca.state.mn.us

or

David Seely, Remedial Project Manager
Office of Superfund
U.S. Environmental Protection Agency – Region 5
77 W. Jackson Blvd.
Chicago, IL 60604
Phone: 312-886-7058
Email: seely.david@epa.gov

To view the documents in the MPCA's administrative record that contain more details on the cleanup activities at this site, call the MPCA at 651-296-6300 or 800-657-3864.